

Appl. No. 10/661,317
Atty. Docket No. 9033
Amdt. dated July 14, 2006
Reply to Office Action of April 17, 2006
Customer No. 27752

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1.) (currently amended) A polymer system comprising:

A.) an anionic polymer selected from the group consisting of

(i) anionic polymers comprising;

a.) a first moiety derived from monoethylenically unsaturated C₃-C₈ monomers comprising at least one carboxylic acid group, salts of such monomers, and mixtures thereof; and

b.) a second moiety selected from the group consisting of:

(1) moieties derived from modified unsaturated monomers having the formulae R – Y – L and R – Z wherein:

i.) R is selected from the group consisting of C(X)H=C(R¹)- wherein R¹ is H, or C₁-C₄ alkyl; and X is H, CO₂H, or CO₂R₂ wherein R₂ is hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₁-C₂₀ alkyl, C₆-C₁₂ aryl, and C₇-C₂₀ alkylaryl;

ii.) Y is selected from the group consisting of –CH₂-, –CO₂-, –OCO-, ~~and~~ –CON(R^a)-, ~~and~~ –CH₂OCO-; wherein R^a is H or C₁-C₄ alkyl;

iii.) L is selected from the group consisting of hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₁-C₂₀ alkyl, C₆-C₁₂ aryl, and C₇-C₂₀ alkylaryl; and

iv.) Z is selected from the group consisting of C₆-C₁₂ aryl and C₇-C₁₂ arylalkyl; and

(2) moieties having the formula J–G–D wherein:

i.) J is selected from the group consisting of C(X)H=C(R₁)- wherein R₁ is H, or C₁-C₄ alkyl; X is H, CO₂H, or CO₂R₂ wherein R₂ is hydrogen, alkali metals, alkaline earth metals, ammonium and amine bases, saturated C₂-C₂₀ alkyl, C₆-C₁₂ aryl, C₇-C₂₀ alkylaryl;

Appl. No. 10/661,317
 Atty. Docket No. 9033
 Amdt. dated July 14, 2006
 Reply to Office Action of April 17, 2006
 Customer No. 27752

ii.) G is selected from the group consisting of C₁-C₄ alkyl, -O-, -CH₂O-,
 , -CO₂-;

iii.) D is selected from the group consisting of

-CH₂CH(OH)CH₂O(R³O)_dR₄;

-CH₂CH[O(R³O)_dR⁴]CH₂OH;

-CH₂CH(OH)CH₂NR⁵(R³O)_dR⁴;

-CH₂CH[NR⁵(R³O)_dR⁴]CH₂OH, and mixtures thereof; wherein R³
 is selected from the group consisting of ethylene, 1,2-propylene,
 1,3-propylene, 1,2-butylene, 1,4-butylene, and mixtures thereof; R⁴
 is a capping unit selected from the group consisting of H, C₁-C₄
 alkyl, C₆-C₁₂ aryl and C₇-C₂₀ alkylaryl; R⁵ is selected from the
 group consisting of H, C₁-C₄ alkyl C₆-C₁₂ aryl and C₇-C₂₀
 alkylaryl; and subscript index d is an integer from 1 to 100;

(ii) graft co-polymers comprising a first moiety derived from monoethylenically
 unsaturated C₃-C₈ monomers comprising at least one carboxylic acid group,
 salts of such monomers, and mixtures thereof, said first moieties being grafted
 onto a C₁-C₄ carbon polyalkylene oxide, and mixtures thereof; and

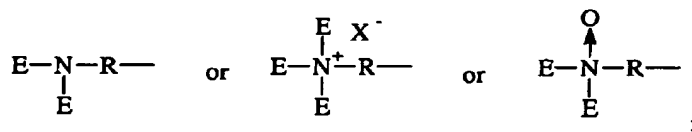
B.) a modified polyamine polymer selected from the group consisting of

(i) modified polyamines having the formulae



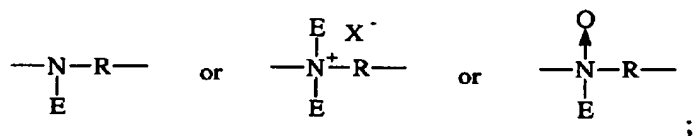
wherein m is an integer from 0 to about 400; n is an integer from 0 to about
 400; k is less than or equal to n wherein

a.) V units are terminal units having the formula:

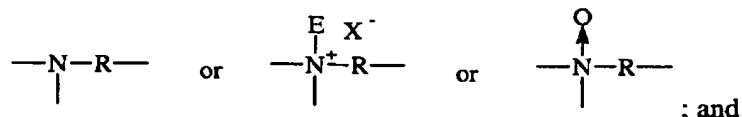


b.) W units are backbone units having the formula:

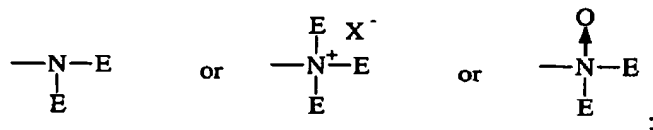
Appl. No. 10/661,317
 Atty. Docket No. 9033
 Amdt. dated July 14, 2006
 Reply to Office Action of April 17, 2006
 Customer No. 27752



c.) Y and Y' units are branching units having the formula:



d.) Z units are terminal units having the formula:



wherein:

R units are selected from the group consisting of C₂-C₁₂ alkylene, C₄-C₁₂ alkenylene, C₃-C₁₂ hydroxyalkylene, C₄-C₁₂ dihydroxy-alkylene, C₈-C₁₂ dialkylarylene, -(R¹O)_xR¹-, -(R¹O)_xR⁵(OR¹)_x-, -(CH₂CH(OR²)CH₂O)_z-(R¹O)_yR¹(OCH₂CH(OR²)CH₂)_w-, -C(O)(R⁴)_rC(O)-, -CH₂CH(OR²)CH₂-, and mixtures thereof; wherein

R¹ is C₂-C₃ alkylene and mixtures thereof;

R² is hydrogen, -(R¹O)_xB, and mixtures thereof;

wherein at least one B is selected from the group consisting of -(CH₂)_q-SO₃M, -(CH₂)_pCO₂M, -(CH₂)_q(CHSO₃M)CH₂SO₃M, -(CH₂)_q-(CHSO₂M)CH₂SO₃M, -(CH₂)_pPO₃M, -PO₃M, and mixtures thereof, and any remaining B moieties are selected from the group consisting of hydrogen, C₁-C₆ alkyl, -(CH₂)_q-SO₃M, -(CH₂)_pCO₂M, -(CH₂)_q(CHSO₃M)CH₂SO₃M, -(CH₂)_q-(CHSO₂M)CH₂SO₃M, -(CH₂)_pPO₃M, -PO₃M, and mixtures thereof;

R⁴ is C₁-C₁₂ alkylene, C₄-C₁₂ alkenylene, C₈-C₁₂ arylalkylene, C₆-C₁₀ arylene, and mixtures thereof;

R⁵ is C₁-C₁₂ alkylene, C₃-C₁₂ hydroxy-alkylene, C₄-C₁₂ dihydroxyalkylene, C₈-C₁₂ dialkylarylene, -C(O)-, -C(O)NHR⁶NHC(O)-, -R¹(OR¹)-, -

Appl. No. 10/661,317
 Atty. Docket No. 9033
 Amdt. dated July 14, 2006
 Reply to Office Action of April 17, 2006
 Customer No. 27752

$C(O)(R^4)_rC(O)-$, $-CH_2CH(OH)CH_2-$, $-CH_2CH(OH)CH_2O(R^1O)_yR^1-$, $OCH_2CH(OH)CH_2-$, and mixtures thereof;

R^6 is C_2-C_{12} alkylene or C_6-C_{12} arylene;

\overline{XX} is a water soluble anion; provided at least one backbone nitrogen is quaternized or oxidized E units are selected from the group consisting of hydrogen, C_1-C_{22} alkyl, C_3-C_{22} alkenyl, C_7-C_{22} arylalkyl, C_2-C_{22} hydroxyalkyl, $-(CH_2)_pCO_2M$, $-(CH_2)_qSO_3M$, $-CH(CH_2CO_2M)-CO_2M$, $-(CH_2)_pPO_3M$, $-(R^1O)_xB$, $-C(O)R^3$, and mixtures thereof; provided that when any E unit of a nitrogen is a hydrogen, said nitrogen is not also an N-oxide;

R^1 is C_2-C_3 alkylene and mixtures thereof;

R^3 is C_1-C_{18} alkyl, C_7-C_{12} arylalkyl, C_7-C_{12} alkyl substituted aryl, C_6-C_{12} aryl, and mixtures thereof;

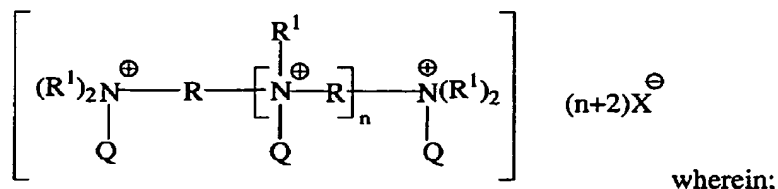
at least one B is selected from the group consisting of $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof, and any remaining B moieties are selected from the group consisting of hydrogen, C_1-C_6 alkyl, $-(CH_2)_q-SO_3M$, $-(CH_2)_pCO_2M$, $-(CH_2)_q(CHSO_3M)CH_2SO_3M$, $-(CH_2)_q(CHSO_2M)CH_2SO_3M$, $-(CH_2)_pPO_3M$, $-PO_3M$, and mixtures thereof;

M is hydrogen or a water soluble cation in sufficient amount to satisfy charge balance; and

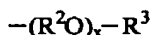
wherein the values for the following indices are as follows: subscript index p is an integer from 1 to 6; subscript index q is an integer from 0 to 6; subscript index r has the value of 0 or 1; subscript index w has the value 0 or 1; subscript index x is an integer from 1 to 100; subscript index y is an integer from 0 to 100; and subscript index z has the value 0 or 1;

(ii) modified polyamines having formula (I):

Appl. No. 10/661,317
 Atty. Docket No. 9033
 Amdt. dated July 14, 2006
 Reply to Office Action of April 17, 2006
 Customer No. 27752



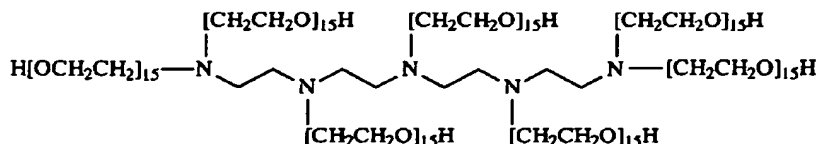
- a.) R is C₆-C₂₀ linear or branched alkylene, and mixtures thereof;
- b.) X[⊖] is an anion present in sufficient amount to provide electronic neutrality;
- c.) n and subscript index n have equal values and are integers from 0 to 4;
- d.) R¹ is a capped polyalkyleneoxy unit having formula:



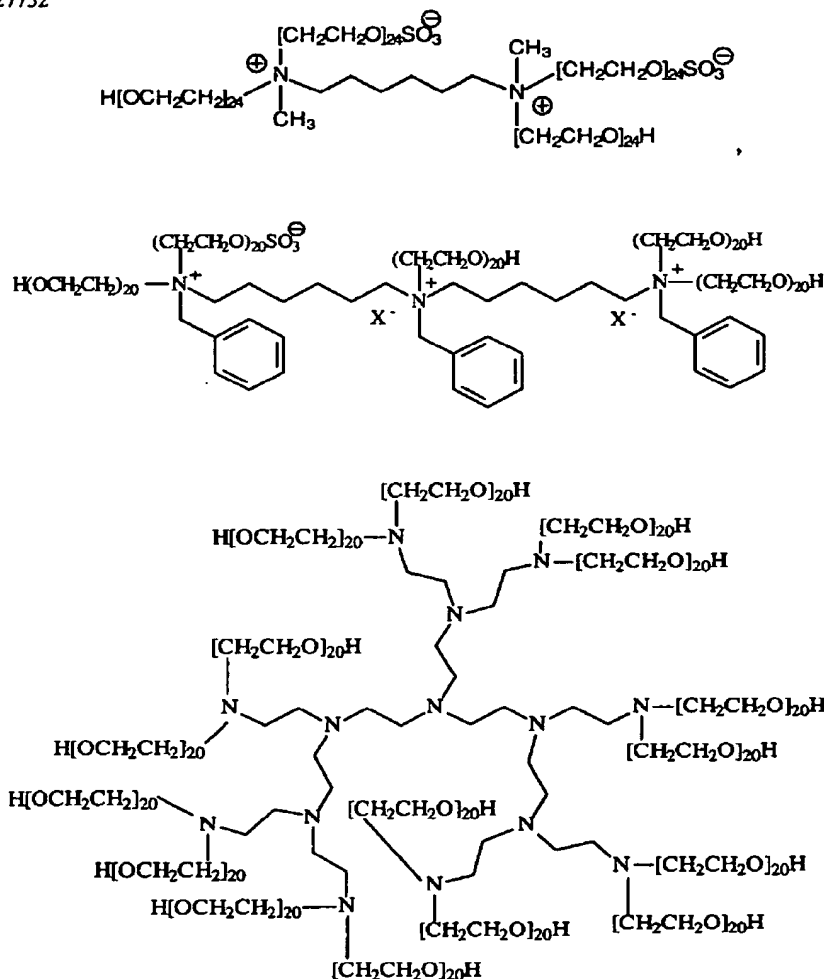
wherein R² is C₂-C₄ linear or branched alkylene, and mixtures thereof; subscript index x has a value from about 1 to about 50; at least one R³ moiety is an anionic capping unit, with the remaining R³ moieties being selected from the group comprising hydrogen, C₁-C₂₂ alkylenearyl, an anionic capping unit, a neutral capping unit, and mixtures thereof;

- e.) at least one Q moiety, is a hydrophobic quaternizing unit selected from the group comprising C₇-C₃₀ substituted or unsubstituted alkylenearyl, and mixtures thereof, any remaining Q moieties are selected from the group comprising lone pairs of electrons on the unreacted nitrogens, hydrogen, C₁-C₃₀ substituted or unsubstituted linear or branched alkyl, or C₃-C₃₀ substituted or unsubstituted cycloalkyl, and mixtures thereof; and mixtures thereof.

2.) (original) The polymer system of Claim 1 wherein said modified polyamine polymer is selected from the group consisting of polymers having the following formulae:



Appl. No. 10/661,317
 Atty. Docket No. 9033
 Amdt. dated July 14, 2006
 Reply to Office Action of April 17, 2006
 Customer No. 27752



and mixtures thereof.

3.) (original) A cleaning composition comprising the polymer system of Claim 1

4.) (cancelled)